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Date of Report: *September 8, 2008*

Contract Number: *DTPH56-08-T-000010*

Prepared for: *U.S. Department of Transportation (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA)*

Project Title: *Direct strain measurements and failure pressure prediction in mechanically damaged and strained pipes*

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Progress to date:

This quarter, Luna Innovations Incorporated began a research and development project for the US DOT PHMSA entitled, "Direct Strain Measurements and Failure Pressure Prediction in Mechanically Damaged and Strained Pipes." The program objective is to improve the reliability of the World's pipelines by:

- Directly measuring strains and stresses due to bending
- Performing field measurements on live strained pipes
- Developing the specifications for a handheld strain measurement tool
- Predicting of the associated burst pressure based on direct measurement of strain

The deliverables for this quarter included a kick-off meeting, finalization of work plan and schedule, and the submission of the first quarterly report.

The project team is being lead by Luna Innovations Incorporated with cost share contributions from PRCI, So Cal Gas, PG&E, and NIST.

Subcontracts are nearly in place and nondisclosure agreements are secured. Major purchases have been ordered and a kick-off meeting has been held. Year one lab measurements should be completed in the next quarter and the ultrasonic and burst pressure modeling tasks will begin. The field work task is tentatively scheduled for the end of the next quarter.

Results and Conclusions

To help guide the path towards developing a portable instrument for strain measurements we are evaluating two commercial handheld ultrasonic instruments. We have received one commercial piezoelectric transducer based handheld thickness gage and will receive a second EMAT based one from a different vendor to determine if they have the resolution to measure strain levels in bent and kinked pipes. We have submitted a purchase order for an EMAT pulser receiver system that will arrive in the next quarter and allow us to complete the lab measurements and perform the field work. We are expecting another pipe to arrive

Plans for Future Activity

The activities planned for the next quarter include completing the Year 1 portion of task one and beginning Task 3 and 4 and 6. Task 1 is lab measurements and Task 3, 4 and 6 are Ultrasonic Modeling, Burst Pressure modeling and Field Work respectively. Under Task 1 we will evaluate the two commercial handheld thickness gages, receive the EMAT equipment and perform ultrasonic strain measurements on kinked and wrinkled pipes to help develop the protocol for strain measurements in the field. We will also begin planning the field work with PRCI and industrial sponsors. During the next quarter we plan to perform the field measurements scheduled for year one.

Issues, Problems or Challenges

Due to protracted negotiations between PRCI and Luna, the first payment from PRCI has not yet been received. However, all terms of the award have been negotiated, and Luna expects to receive the signed award from PRCI during the week of September 8, 2008. The next report will reflect cash cost sharing from PRCI.

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